

PATENT

IGYG:002

11308.0002.NPUS00

APPLICATION FOR UNITED STATES LETTERS PATENT

for

METHOD AND APPARATUS FOR PROVIDING PERSONALIZED  
RELEVANT INFORMATION

by

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NUMBER EL392863440US

DATE OF DEPOSIT 06/26/01

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## BACKGROUND OF THE INVENTION

The coming of the Internet and Information Age has brought with it an explosion in the volume of information that is available to the public. Unfortunately, the vast majority of this information, for example, information relating to travel and travel-related topics, is available to the public only in an unorganized fashion. The sheer quantity of this information can make it nearly impossible for an individual to locate relevant information. Furthermore, there may be at the same time an actual shortage of the type of first-hand, personalized, particularly-relevant information that the individual may desire to locate.

For example, in the case of an individual seeking to plan a vacation, or merely seeking to learn more about a distant location, it is difficult to locate first-hand, particularly-relevant, travel-related information. The individual may rely upon his or her circle of trusted friends or even acquaintances to provide specific first-hand travel advice or experience information. Unfortunately, such advice and information will necessarily be limited by the number of the individual's friends or acquaintances, as well as by the travel habits of such persons. Travel agents may seek to provide an individual with customized travel-related information. However, the travel-related information from travel agents may not be first-hand or objective, being limited to the travel experiences of the agent and/or the agent's clients. Guidebooks may be used to obtain a limited amount of information concerning a travel destination. However, guidebooks suffer from several deficiencies, including the somewhat generic and oftentimes dated nature of their information. So too with travel-related magazines: the travel-information can be generic, rather than providing the sort of comprehensive and personalized first-hand information desired.

Internet-accessible travel magazines typically contain professionally-written travel content. However, the relevance of this content depends in large part upon how closely the personal preferences of the professional travel writer matches the personal preferences of the individual seeking information. The same is true in the case of Internet-accessible opinion sites, which are limited in their ability to take into account the personal preferences of the user.

1 Thus, there exists a real and continuing need for a computer-oriented method and  
2 apparatus designed to provide personalized content information, taking into account both  
3 the personal preferences of the user, as well as the personal preferences and/or other  
4 unique information of the content information provider.

## 5 6 **SUMMARY OF THE INVENTION**

7 The present invention generally relates to a method and apparatus for providing  
8 personalized information based both upon a user's search query, as well as based upon  
9 the user's personal preferences. There is provided a database containing contributor  
10 records that include contributor content records and contributor profile records. The  
11 database includes descriptor information corresponding to each contributor content  
12 record. Additional contributor content records may be added to the database, and  
13 valuable consideration may be provided to the contributor in exchange for his or her  
14 contribution. The database may optionally also include foundation content, travel  
15 provider content, or other types of content.

16 The present invention also includes a computer program adapted to receive a  
17 user's search query and personal preference information. The program then utilizes both  
18 the search query and the personal preference information to locate and display  
19 particularly relevant, personalized information from within the content records of the  
20 database.

## 21 22 **DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS**

23 The present invention is generally directed to a method and apparatus for  
24 providing personalized information to a user from a database, based both upon the user's  
25 search query and the user's personal preferences.

### 26 27 *The Database:*

28 In one embodiment, a database is maintained on one or more server computers  
29 accessible to individual users and contributors via the Internet or World Wide Web. The  
30 database includes a plurality of contributor content records. Each content record may  
31 contain unique, specific information, composed by a contributor, concerning a topic of



1           Personal identification information may include information such as the  
2 contributor's name, user name, e-mail or physical address, date of birth, age, gender,  
3 educational and professional background, income level, and free-form self-description  
4 information. Travel interests information may include information such as the  
5 contributor's favorite travel activities, for example natural wonders, arts festivals, hiking,  
6 fishing, bars and pubs, historical tours, and live performances. Travel interests  
7 information may also include information concerning the types of travel activities of the  
8 contributor, such as top attractions, local events, cruises, family fun, nightlife, arts and  
9 culture, great outdoors, shopping, sports, and specialty tours, and the like. Travel-related  
10 attributes may include such information as the contributor's preferences for adventure  
11 (for example, high, medium, or low), preferences for fitness-demanding travel  
12 experiences, sensitivity for cost, desire to travel "off the beaten path," and desire for  
13 higher culture. Dining preference information may include information such as the  
14 contributor's preferences for local cuisine, fine dining, healthy cuisine, or romantic  
15 dining. Accommodation preference information may include information such as the  
16 contributor's preferences for hotels, motels, bed and breakfast establishments, spas and  
17 resorts, rental condos/houses, camping, guest houses, hostels, timeshares, or the like.  
18 Favorite destination information may include information such as the contributor's  
19 favorite restaurants, hotels, national parks, cities, or the like. Aspirated destination  
20 information may include information such as the contributor's dream vacation locations,  
21 or dream hiking locations.

22           In one aspect of the present invention, the database includes contributor profile  
23 records submitted by contributors. A contributor profile record may also be updated, if  
24 desired, by a contributor, to reflect changes to his or her personal preferences. A  
25 contributor who wishes to submit a contributor profile or content record to the database  
26 may do so via any number of methods, for example via the Internet. When a contribution  
27 of a content record is made, a computer program in accordance with the present invention  
28 stores the contributor content record in the database, and assigns that record to  
29 correspond to the contributor's current contributor profile record. In another aspect of the  
30 present invention, descriptor information may be generated for the contributor content  
31 record, so that the content record may be more easily identified.

1 In one embodiment of the present invention, a contributor may be rewarded with  
2 valuable consideration in exchange for his or her contribution. That valuable  
3 consideration may take many forms, including currency, or credits redeemable for such  
4 things as prizes, travel equipment, airline tickets, or the like. In another embodiment of  
5 the present invention, a contributor content record may be rated according to its quality.  
6 Such rating may be performed by other contributors, by users, and/or by the maintainer of  
7 the database. Valuable consideration credited to the contributor may be varied according  
8 to such things as the content record's length, degree of detail, and/or rating by others.

9 In another aspect of the present invention, the database may include foundation  
10 content, such as records created not by contributors, but by commercial information  
11 providers. Such foundation content may include electronic versions of travel guidebooks  
12 from established companies. Foundation content may also include information from  
13 consumer protection groups, governmental agencies, or the like. In any case, such  
14 foundation content may include foundation content records, such as guidebook content  
15 records, and may also include descriptor information corresponding to each guidebook  
16 content record. Foundation content records may be licensed from their owner or owners  
17 by the maintainer of the database, and the maintainer may provide valuable consideration  
18 for its license. In an alternative, the owner(s) of the foundation content records may  
19 provide consideration to the maintainer of the database, in exchange for the provision of  
20 the content records to users and other parties.

21 The database may also include travel provider content, such as information from  
22 airlines, hotels and resorts, tour operators and guides, and the like. Such information may  
23 include information concerning a travel provider's available services, such a highlights,  
24 cost and reservation information, suitability for children or the elderly, or the like. In any  
25 case, such information may take the form of travel provider content records, and may  
26 include descriptor information corresponding to each travel provider content record.  
27 Likewise, travel provider content records may be licensed by the maintainer of the  
28 database, who may provide valuable consideration to the owner of the travel provider  
29 content records. Alternatively, the owner of the travel provider content records may  
30 provide consideration to the maintainer of the database. Such consideration may vary  
31 according to the number of users who access the content record, according to the number

1 of users who access the travel provider's goods or services, and/or according to other  
2 factors.

3 In another embodiment of the present invention, foundation content or travel  
4 provider content may likewise be rated according to its quality, such rating being  
5 performed by contributors, by users, and/or by the maintainer of the database.

6  
7 *Providing Personalized Information:*

8 The present invention may include a device for accessing and querying the  
9 database to provide a user with personalized information. In one embodiment, the  
10 invention includes a computer program running on one or more server computers, such  
11 that a user may connect and interact with the program via the Internet.

12 It should be noted that the term "user" as used herein is intended to refer to an  
13 individual seeking information from the database. A user may take the role of a  
14 contributor by providing a contributor content record; and likewise, a contributor may  
15 take the role of a user by querying the database for information.

16 Associated with each user is a user profile record. Such user profile record may  
17 contain the same or similar types of preference information relating to the user, as a  
18 contributor profile record may contain relating to a contributor. The user's user profile  
19 record may be conveniently stored within the database, but it need not be.

20 According to one aspect of the present invention, a user seeking particularly  
21 relevant, personalized information may transmit a search query to the database via the  
22 Internet. It will be understood that the user may initiate this search query via any number  
23 of convenient means, for example, by entering a keyword, or by clicking on a hyperlink  
24 from a webpage. Suitable keywords will, of course, depend upon the subject matter of  
25 contributor content records available in the database, and especially upon the information  
26 contained in the descriptor information corresponding to the contributor content records.  
27 The transmitted search query, along with the user's user profile record, are then used by  
28 the computer program's content match algorithm to identify and present contributor  
29 content records that may be particularly relevant to the user.

30 In one embodiment of the current invention, the computer program compares a  
31 user search query with descriptor information corresponding to contributor content

1 records to identify generally responsive contributor content records. Such methods are  
2 well known in the art, and so for brevity will not be discussed here. The computer  
3 program also compares the user profile record with each of the contributor profile records  
4 corresponding to the responsive contributor content records just identified. Alternatively,  
5 the program may first compare a user profile record with contributor profile records to  
6 identify contributors whose content records may be expected to be particularly relevant to  
7 the user, and then compare the user search query with descriptor information  
8 corresponding to those contributor content records that may be expected to particularly  
9 relevant.

10 It will be appreciated that the exact methods and procedures for comparing a user  
11 profile record with a contributor profile record will necessarily depend upon the  
12 particular format of the profile records. For example, a profile record may include a  
13 plurality of data elements, where each data element contains one or more discrete pieces  
14 of information concerning the record's author. Thus, any number of comparison  
15 algorithms may be suitable.

16 In one embodiment of the present invention, any number,  $D$ , of corresponding  
17 data elements from user and contributor profile records are compared with each other to  
18 generate  $D$  comparison score(s). According to the present invention,  $D$  may be any  
19 positive integer, but may preferably be greater than or equal to 2, or greater than or equal  
20 to 3. The comparison scores are then combined via a suitable formula, that for example  
21 may appropriately weigh each of the comparison scores, to calculate a match rating  
22 between the user profile record and the contributor profile record. This match rating may  
23 then be used to further personalize and rate for relevancy the previously-identified  
24 contributor content records.

25 In one embodiment, a profile record may contain a data element representing the  
26 author's gender. Should a user profile record include a data element containing  
27 information representing a male author, and a contributor profile record include a  
28 corresponding data element containing information representing a female author, then  
29 there would be generated for that data element a comparison score of 0. Likewise, should  
30 the respective user and contributor profile records include a data elements containing





In such a case, it may be desirable to generate a comparison score that counts not only the absolute number of activities in common between the user profile record and the contributor profile record, but also takes into consideration the relative rank of the common activity within the records.

A data element above from a user profile record may be represented as an array, `UserProfile.Activity [ j ]`, representing a rank-ordering of the user's favorite activities. A data element from the corresponding contributor profile record may be represented as array `ContributorProfile.Activity [ k ]`. A suitable comparison score, represented as `Score.Activity`, may be generated by means of the following nested-loop algorithm:

```

Score.Activity = 0
for j = 1 to N
    for k = 1 to N
        if UserProfile.Activity [ j ] = ContributorProfile.Activity [ k ] then
            Score.Activity = Score.Activity + { [N-(j+k)/2] + 2 * [N - avg.(j, k)] }
        end if
    endfor
endfor

```

The resultant comparison score may be appropriately scaled to a value from 0 to 1 by dividing it by  $[(3 N^2) - N(N+1)/2]$ . Alternatively, a suitable comparison score may be generated by substituting the following formula in the above nested-loop algorithm:

```

Score.Activity = Score.Activity + { [N-(j+k)/2] * [N - avg.(j, k)] }

```

This alternative resultant comparison score may appropriately be scaled to a value from 0 to 1 by dividing it by  $\{ N * [ N^2 - N - (N - 1)! ] \}$ .

In certain embodiments of the present invention, user and contributor profile records may each include a data element containing information representing a user's and



1 this sum by maximum number of common types of travel activities with respect to the  
2 data elements.

3 User and contributor profile records according to the present invention may also  
4 each include a data element containing information representing the user's and  
5 contributor's respective travel attributes. In certain embodiments of the invention, such a  
6 data element may include information relating to such topics as a user's or a contributor's  
7 desire for adventure, fitness level, budget requirements, desire to travel off the beaten  
8 path, desire for higher culture, and family status. To that end, a user or contributor  
9 entering his or her profile record information may be requested to specify: high, medium,  
10 or low, with respect to the preceding first five topics; and this information may of course  
11 be represented by any suitable set of values, for example, 0, 1, and 2. A user or  
12 contributor entering his or her profile record information may also be requested to specify  
13 yes or no, with respect to whether the user or contributor intends to be traveling as a  
14 family unit; and this information may be represented by suitable values, 0 and 1.

15 In a preferred embodiment of the current invention, a travel attributes data  
16 element from a user profile record is compared with a corresponding data element from a  
17 contributor profile record. A travel attribute comparison score may be generated via any  
18 of several formulas. According to one embodiment of the invention, a travel attribute  
19 comparison score is generated by simply adding together a number of generated  
20 subscores, and dividing this sum by the number of subscores used. For example, a  
21 adventure subscore may be generated by determining the absolute difference between the  
22 value representing a user's desire for adventure and the value representing a contributor's  
23 desire for adventure, and by subtracting this difference from one. Other subscores, for  
24 fitness level, budget requirements, desire to travel off the beaten path, and desire for  
25 higher culture, may similarly be generated. A family subscore may be generated by  
26 simply assigning a score of 1 when the family status information in the user profile  
27 record is the same as that of the contributor profile record, and assigning a sub-score of 0  
28 when the family status information in the user profile record is not the same as that in the  
29 contributor profile record.

30 According to another aspect of the invention, a travel attribute comparison score  
31 is generated as follows. Attribute subscores are generated for all attributes other than

1 budget and family status, according to the method above, *i.e.*, by determining the absolute  
2 difference between the value representing a user's particular attribute and the value  
3 representing a contributor's corresponding attribute, and by subtracting this difference  
4 from one. A budget attribute subscore is generated by determining the absolute  
5 difference between the value representing a user's budget requirements and the value  
6 representing a contributor's budget requirements, by dividing this difference by three,  
7 and then by subtracting this quotient from one. The travel attribute comparison score,  
8 having a range from 0 to 1, is then generated by adding together each of the attribute  
9 subscores, and then dividing this sum by the number of attributes.

10 Of course, it will be understood that the various comparison score generation  
11 methods discussed above are presented by way of example only, and not limitation. One  
12 of ordinary skill working within the scope of the present invention with the benefit of this  
13 disclosure will comprehend that other comparison score generation methods may be  
14 suitable, depending upon the particular types of information represented by  
15 corresponding data elements within user and contributor profile records. Moreover, it  
16 will also be understood that data elements within the scope of the present invention may  
17 contain profile information in formats other than the exemplary formats disclosed above,  
18 and that one of ordinary skill with the benefit of this disclosure will easily be able to  
19 design suitable comparison score generation methods within the scope of the current  
20 invention appropriate for these other data elements.

21 In one embodiment of the present invention, a match rating is calculated between  
22 a user profile record and a contributor profile record by simply adding together any  
23 number of *D* comparison scores, as discussed above. For example, a suitable match  
24 rating may be calculated by summing the generated comparison scores for age, travel  
25 attributes, travel activity, and type-of-travel-activity. In another embodiment, the match  
26 rating may be calculated by suitably weighting the comparison scores prior to adding  
27 them together. For example, another suitable match rating may be calculated by adding  
28 together the weighted comparison scores for type-of-travel-activity, travel attributes,  
29 travel activity, dining preference, and accommodation preference, where the preceding  
30 comparison scores are weighted by multiplying them by weighting factors of 5, 5, 3, 1,  
31 and 1, respectively. Still another suitable match rating may be calculated by adding

1 together the following weighted seven comparison scores: age, gender, type-of-travel-  
2 activity, travel attributes, travel activity, dining preference, and accommodation  
3 preference, wherein the preceding comparison scores are weighted by multiplying them  
4 by weighting factors of 5, 5, 5, 5, 3, 1, and 1, respectively.

5 It will also be understood that the various match rating calculation methods  
6 discussed above are presented by way of example only, and not limitation. One of  
7 ordinary skill working within the scope of the present invention with the benefit of this  
8 disclosure will comprehend that other match rating calculation methods may be suitable,  
9 depending upon the particular types of information represented by the various  
10 comparison scores.

11 As discussed above, as a result of the above comparisons, there is calculated a  
12 match rating describing the degree to which a user and a contributor share the same  
13 personal preferences. This match rating may be used to personalize the content  
14 information provided to a user. For example, in one embodiment of the present  
15 invention, selected contributor content records may be displayed to a user, based upon the  
16 results of a user search query. Alongside the contributor content records, there may be  
17 displayed indications of the match ratings calculated for the contributor profile records  
18 associated with the displayed contributor content records. Optionally, other information  
19 may also be displayed alongside a contributor content record, such as an indication  
20 relating to the quality and/or popularity of the contributor content record.

21 In another embodiment of the present invention, a limited number of contributor  
22 content records may be selected for display based upon both the user query and the match  
23 rating. This may of course be accomplished in several ways. For example, in one  
24 embodiment, a number of the contributor content records may be identified based upon  
25 the results of a comparison between the user search query and the descriptor information  
26 corresponding to the contributor content records. A match rating is calculated for these  
27 identified contributor content records, and the records are then displayed in their order of  
28 particular relevance as determined by their match ratings. Alternatively, only a  
29 particularly-relevant number or portion of the previously-identified contributor content  
30 records may be displayed, again based upon their relatively-high match ratings.

1 For each of the above embodiments, other personalized information may  
2 optionally be displayed alongside a contributor content record, such as an indication  
3 relating to the quality and/or popularity of the contributor content record.

4 In other aspects of the present invention, the database may also include  
5 foundation content, including content records from commercial sources. It may include  
6 travel provider content, including travel provider content records. Descriptor information  
7 may be associated with either of these types of content records. Such foundation content  
8 and travel provider content may be accessed when a user enters a search query. In  
9 response, the computer program compares the search query with the descriptor  
10 information in order to identify and display responsive foundation and/or travel provider  
11 content records.

12  
13 *Other Aspects of the Invention:*

14 In a still further aspect of the current invention, personalized information may be  
15 provided as follows. The descriptor information corresponding to contributor content  
16 records may be configured to include one or more data elements having formats  
17 compatible with at least one or more of the data elements contained in a user profile  
18 record. For example, a contributor content record may include an account of a  
19 contributor's visit to a museum in a certain city. Corresponding to this content record  
20 may be certain descriptor information as previously discussed above, including  
21 keywords, a title, category and/or index descriptions, or the like: for example,  
22 "Moscow," "Russia," "art museum," etc. According to this further aspect of the present  
23 invention, descriptor information for this content record may include one or more data  
24 elements describing the content record's specific subject matter, for example, data  
25 elements such as the following: travel interests or activity (museum), type or category of  
26 travel activity (arts and culture), and travel attributes (adventure = medium; required  
27 fitness = low; budget requirement = low; off-the-beaten path = low; culture = high;  
28 family friendliness = medium), or the like. In this instance, the descriptor information of  
29 a contributor content record may be compared with a user's user profile record. As in the  
30 case of the comparison of a user profile record to a contributor profile record, it will be  
31 appreciated that a number of suitable methods may be used to generate comparison

scores between compatible data elements, and a number of suitable formula may be used to further calculate a match rating between a user profile record and the compatible portion of the descriptor information associated with a contributor content record.

Thus, personalized information, including selected or relevancy-rated contributor content records, may be obtained by a user from a database, based upon a comparison of a user profile record with both (i) at least two contributor profile records; and (ii) the descriptor information associated with the contributor content records. For example, in one embodiment, the mechanism for obtaining this personalized information may include the combination of two separately-calculated match ratings. That is, there may be combined a first match rating, calculated for a user profile record and a contributor profile record, and a second match rating, calculated for the user profile record and the appropriate portion of the descriptor information associated with a corresponding contributor content record. In another embodiment, data elements from a user profile record may be compared with those from both a contributor profile record and from corresponding descriptor information, according to the above methods. However, rather than using calculating two separate match ratings, there may be calculated a single, combined match rating.

In other embodiments of the current invention, descriptor information corresponding to foundation content records may also be configured to include one or more data elements compatible with one or more data elements of a user profile record. Similarly, descriptor information corresponding to travel provider content records may also be configured to include one or more such compatible data elements. In either case, additional personalized information, including selected or relevancy-rated foundation or travel provider content records, may be obtained according to the present invention. For these embodiments, a user may submit a search query to a computer program of the present invention. As before, the program compares the user search query with at least a portion of descriptor information corresponding to foundation or travel provider content records, and identifies generally responsive foundation or travel provider content records. The program also obtains the user's user profile record, compares it with a compatible portion of the descriptor information corresponding to the identified generally responsive foundation or travel provider content records. From this comparison the program



1 calculates a suitable match rating for each of the identified generally responsive  
2 foundation or travel provider content records. Using these comparison results, the  
3 program then provides the user with the desired particularly-relevant, personalized  
4 information, including selected or relevancy-rated foundation or travel provider content  
5 records.

6 In another embodiment of the current invention, the computer program may  
7 provide a mechanism for a user to identify contributors and/or other users having similar  
8 personal preferences. Upon receiving such a request from a user or from another source,  
9 the program may compare the user's user profile record to any number of contributor  
10 profile records, and optionally, to any number of the user profile records of other users,  
11 and for each may calculate a match rating according to the methods described above. A  
12 user may then receive a listing of contributors or other users having similar personal  
13 preferences, and may also be provided with at least a portion of those contributors' or  
14 users' profile records. In this way, a user may learn about and contact individual  
15 contributors and other users, and perhaps seek out further information concerning their  
16 shared interests.

17 Although specific embodiments of the invention have been described herein in  
18 some degree of detail, this has been done merely to illustrate various features and aspects  
19 of the present invention, and is not to be construed as limiting the scope of the invention  
20 as defined by the claims which follow. Those of ordinary skill in the art will appreciate  
21 that various substitutions, alterations, and/or modifications, including but not limited to  
22 those design variations and options that have been specifically noted herein, may be made  
23 to any of the embodiments of the invention disclosed herein without departing from the  
24 spirit and scope of the claims which follow.